

CLAIMS

We claim:

1. A polyaxial locking screw plate assembly comprising:
 - a plate having a plurality of through holes, at least one said through holes being elongated in the plane of the plate and including opposing tapered side walls;
 - a corresponding at least one coupling element, said at least one coupling element including a central hole for receiving a screw therethrough and opposing tapered exterior surfaces such that said at least one coupling element may initially slide along an elongate axis of said corresponding elongate through hole when said coupling element is loosely nested therein; and
 - at least one corresponding screw having a head portion and a shaft portion, said shaft portion being insertable through the corresponding central hole in said corresponding at least one coupling element, and said head portion being larger than necessary to travel through the central hole in the coupling element such that advancement of said shaft portion through said central hole causes the head portion to engage the coupling element and to cause the coupling element to be driven into the corresponding through hole of the plate such that the coupling element and the plate are crush locked together by virtue of their mutual tapers.
2. The assembly as set forth in claim 1, wherein said at least one coupling element further comprises an axial slot formed therein which slot permits the expansion and contraction of the central hole by means of a lateral force applied to the opposing tapered exterior surfaces thereof.
3. The assembly as set forth in claim 1, wherein said central hole further comprises a curvate interior volume, and wherein said screw includes a curvate head portion which seats in said curvate interior volume.
4. The assembly as set forth in claim 2, wherein said coupling element further comprises a lower outer lip which engages a lower edge of said elongate tapered through hole of said plate such that said coupling element is initially slideably retained within said through hole.

5. The assembly as set forth in claim 2, wherein said central hole further comprises a curvate interior volume, and wherein said screw includes a curvate head portion which seats in said curvate interior volume, and wherein said curvate head portion is crush locked therein by the application of a lateral force against the opposing tapered exterior surfaces of the coupling element by the opposing tapered side walls of the elongate through hole into which it is driven and which causes the contraction of the central hole.

6. The assembly as set forth in claim 1, wherein the head portion of said at least one screw comprises a recess to which a screwdriving tool is mateable for inserting said screw through the corresponding central hole.

7. A polyaxial locking screw plate assembly comprising:

a plate having a plurality of through holes, at least one said through holes being elongated in the plane of the plate and including opposing tapered side walls;

a corresponding at least one coupling element, said at least one coupling element including a central hole for receiving a screw therethrough, said hole including a curvate interior volume, and said coupling element further including opposing tapered exterior surfaces such that said at least one coupling element may initially slide along said elongate axis of said corresponding elongate through hole when loosely nested therein, and further including at least one axial slot such that said coupling element and said interior volume may expand and contract by the application of lateral forces acting upon said opposing tapered exterior surfaces; and

at least one corresponding screw having a curvate head portion and a shaft portion, said shaft portion being insertable through the corresponding central hole in said corresponding at least one coupling element within a range of angles including non-perpendicular angles, and a curvate head portion having a diameter which is greater larger than necessary to travel fully through the central hole in the coupling element, but which seats fully in said curvate interior volume thereof, such that advancement of said shaft portion through said central hole causes the head portion to enter the interior volume and to cause the coupling element to be driven into the corresponding through hole of the plate such that the coupling element and the plate are crush locked together by virtue of their mutual tapers, and such that

the curvate head is locked within the curvate interior volume of the coupling element by virtue of the contraction of the axial slot.